

COUNTRY ANALYSIS BRIEFS

Ecuador

Last Updated: April 2008

Background

Ecuador is one of Latin America's largest crude oil exporters.

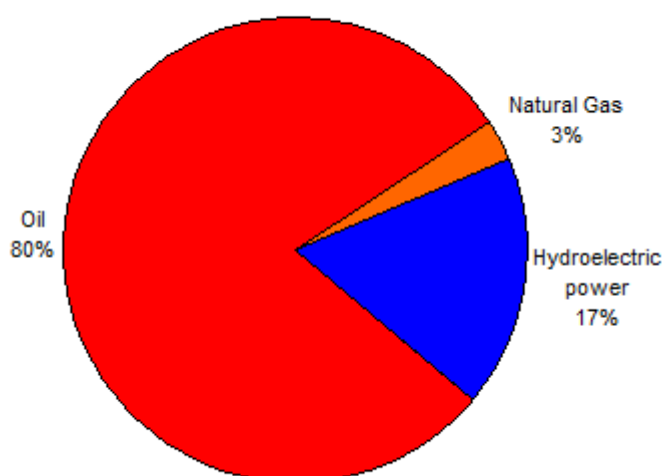
Ecuador is one of Latin America's largest crude oil exporters, with net oil exports estimated at 350,000 barrels per day (bbl/d) in 2006. The oil sector dominates the Ecuadorian economy, accounting for almost half of total export earnings and one-third of all tax revenues. Despite its large oil exports, Ecuador must still import refined petroleum products due to the lack of sufficient domestic refining capacity to meet local demand. As a result, the country does not always enjoy the full benefits of high world oil prices: while these high prices bring Ecuador greater export revenues, they also increase the country's refined product import bill.



In 2007, Ecuador re-joined the Organization of the Petroleum Exporting Countries (OPEC), after leaving the organization at the end of 1992. Ecuador is the smallest oil producer in OPEC, with an assigned production quota of 520,000 bbl/d. Since Ecuador is currently producing below its quota level, it is unclear what, if any, effect OPEC membership will have upon the country's oil production levels.

Ecuador's energy mix is largely dependent upon oil, which represented 80 percent of the country's total energy consumption in 2005. Hydroelectric power represented 17 percent of total energy consumption in 2005, and it is the largest source of electricity generation. Natural gas consumption is small, due to the lack of domestic infrastructure to transport and distribute the fuel.

Total Energy Consumption in Ecuador, by Type (2005)



Source: International Energy Annual 2005

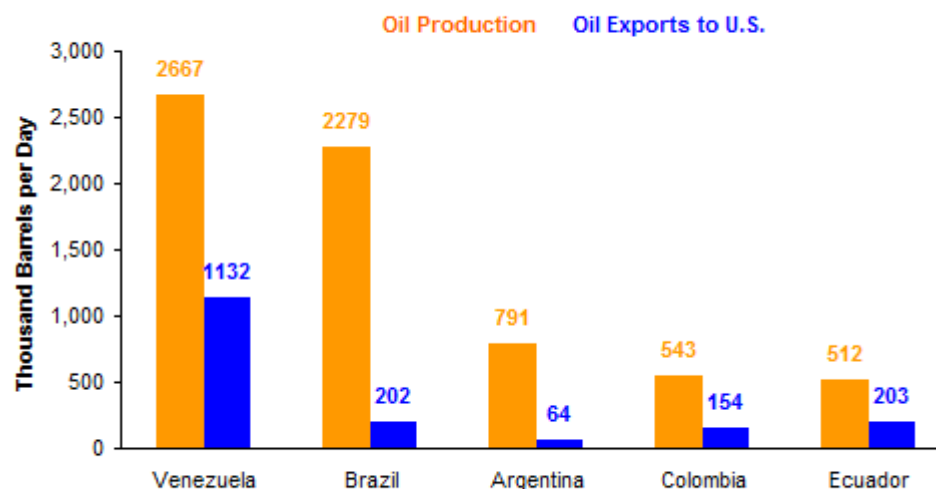
Oil

Ecuador is the second-largest South American supplier of crude oil to the United States.

According to *Oil and Gas Journal (OGJ)*, Ecuador held proven oil reserves of 4.5 billion barrels in January 2008, the third largest in South America. Ecuador is the fifth-largest producer of oil in South America, producing 512,000 bbl/d of oil in 2007 (almost all of which was crude oil), down from 538,000 bbl/d in 2006. As of April 2008, Ecuador had an OPEC crude oil production quota of 520,000 bbl/d.

Crude oil production has increased sizably since the opening of the *Oelductode Crudos Pesados* (OCP) in September 2003 (see below). However, production has fallen in recent years, the result of natural decline, the lack of new project development, and some operating difficulties at existing oil fields. In 2006, Ecuador consumed 152,000 bbl/d of oil, leaving 2006 net exports of 350,000 bbl/d. Ecuador sends over 50 percent of its oil exports to the U.S., the remainder split between Latin America and Asia; in 2007, Ecuador exported 203,000 bbl/d of crude oil and refined products to the United States, about two percent of U.S. oil imports. Ecuador is the second-largest source of U.S. crude oil imports from South America, after Venezuela. Other important destinations of Ecuador's crude oil exports include Peru, Chile, and Central America.

Top South American Oil Producers, 2007



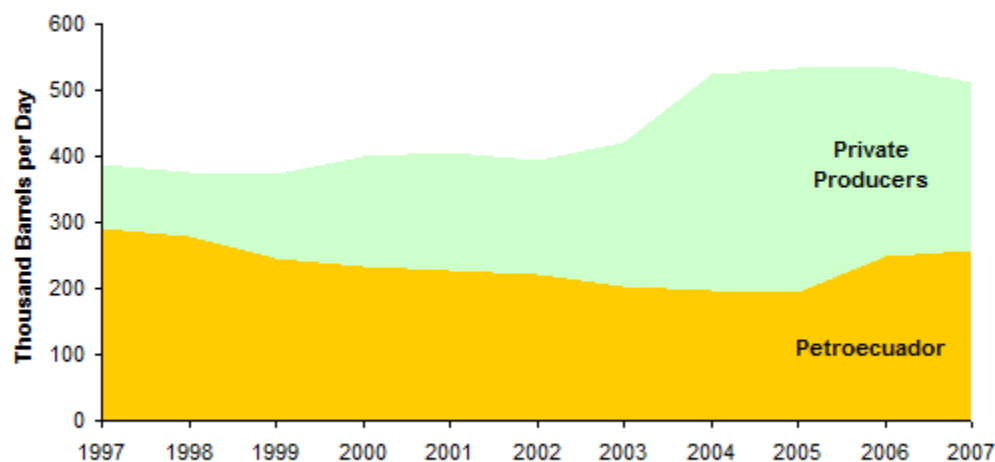
Source: EIA Short Term Energy Outlook

Sector Organization

Petroecuador, owned by the Ecuadorian government, was responsible for 51 percent of the country's crude oil production during 2007. The largest foreign-owned oil company is Repsol-YPF; during the first half of 2007, Repsol-YPF production in Ecuador represented 13 percent of the country's total crude oil production. Other important foreign oil producers include Andes Petroleum (12 percent of national production), a consortium led by the Chinese National Petroleum Corporation (CNPC) that acquired assets in September 2005 formerly owned by EnCana; Perenco (4.9 percent of national production); and Agip (4.7 percent of national production).

While Ecuador's crude oil production increased 31 percent from 2001 to 2005, Petroecuador's share of national crude oil output declined from 56 percent to 37 percent during that same period. However, Petroecuador's share of national production jumped to 46 percent in 2006, following the company's takeover of the former production assets of Occidental Petroleum. According to media reports about the issue, the proximal cause for the takeover was the claim by the Ecuadorian government that Occidental had violated its production contract by transferring some assets to another oil company. Prior to this, however, there had been other disagreements between the two parties, including a \$76 million arbitration award to Occidental in 2004 over a dispute regarding back taxes. Occidental has since launched an arbitration claim against the Ecuadorian government seeking compensation for the takeover.

Ecuador's Oil Production, by Sector, 1997-2007



Source: Banco Central del Ecuador

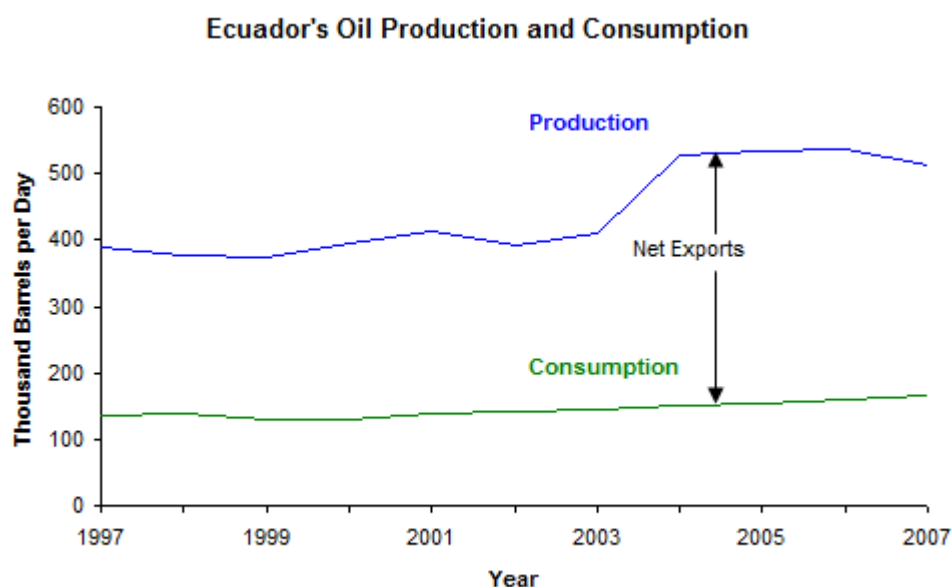
In October 2007, President Correa signed a decree establishing a 99 percent windfall tax on oil company profits, up from the 50 percent rate established in 2006. The tax takes effect whenever Ecuador's oil export basket exceeds \$24 per barrel; while Ecuador's export basket trades at a substantial discount to world benchmark crude prices like WTI, it was well higher than this threshold level in 2007 and expected to remain so in the short-term. The decree offered an alternative to the higher tax levels: oil companies could agree to transition their projects to service agreements, where they would produce oil on behalf of the government for a fee. However, under these deals, the companies would transfer existing investments at the field to the government and would no longer be able to book (for accounting purposes) oil reserves at the field. According to media reports, companies continued to negotiate the terms of the new policies with the Ecuadorian government in early 2008.

Exploration and Production

Ecuador's most productive oil fields are located in the northeast corner of the country. The largest oil field is Petroecuador's Shushufindi. Other major oil fields include Sacha (Petroecuador), Dorine (Andes), and Eden Yuturi (Petroecuador, formerly Occidental). Ecuador produces two varieties of crude oil: Oriente and Napo. Napo is a heavy, sour crude, with a 19° API and 2 percent sulfur content, while Oriente is a medium-heavy, medium-sour crude, with a 29° API and 1 percent sulfur content.

Future increases in Ecuador's crude oil production will likely come from development of the Ishpingo-Tapococha-Tiputini (ITT) block. The government plans to open ITT to foreign producers through a licensing round in the near future. The ITT block, located in Ecuador's Amazon region, contains an estimated 900 million barrels of proven reserves, with potential recoverable reserves as high as 1.3 billion barrels. Analysts predict that, if fully developed, the block could produce at least 190,000 bbl/d. However, the ITT block reportedly contains a variety of crude oil even heavier than Napo, so any oil producer would need to blend the crude with lighter hydrocarbons before shipping it via Ecuador's pipeline network.

As an alternative to the development of the ITT block, President Correa floated the idea that the international community could pay Ecuador to not produce the oil reserves there. The country sought \$350 million per year over a ten year period, representing its estimate of one-half of the revenues that it could earn from oil production from the ITT block. There has been significant opposition to oil development in Ecuador by indigenous groups, which object to increasing oil production in the Amazon region on environmental grounds. These groups have repeatedly obstructed exploration and production activities in Ecuador's eastern region. The ITT block, which sits deep in the Amazon region, could face resistance from these groups.



Source: EIA International Energy Annual; Short Term Energy Outlook

Protests against the oil industry can have a direct impact upon the country's crude production. These kinds of production outages are usually small, affecting minor amounts of crude oil production and often last no more than a few weeks. However, these actions will occasionally shut-in large segments of Ecuador's oil production capacity. In August 2005, protest groups shut down Petroecuador's crude oil production for a week, forcing the company to declare *force majeure* on its crude exports. In February 2006, Petroecuador shut down the a major pipeline system for several days, after protesters occupied a pumping station.

Pipelines

Ecuador has two major oil pipeline systems. The first is the *Sistema Oleoducto Trans-Ecuatoriano* (SOTE), built in the early 1970s. The 310-mile, 400,000-bbl/d SOTE runs from Lago Agrio to the Balao oil terminal on the Pacific coast. SOTE has suffered from natural disasters that severely disrupted Ecuador's oil production. In March 2008, landslides damaged SOTE, shutting operating for several days. In March 2004, another landside halted oil shipments through SOTE, prompting Petroecuador to declare *force majeure* on its export contracts. In 1987, an earthquake destroyed a large section of SOTE, reducing Ecuador's oil production for that year by over 50 percent.

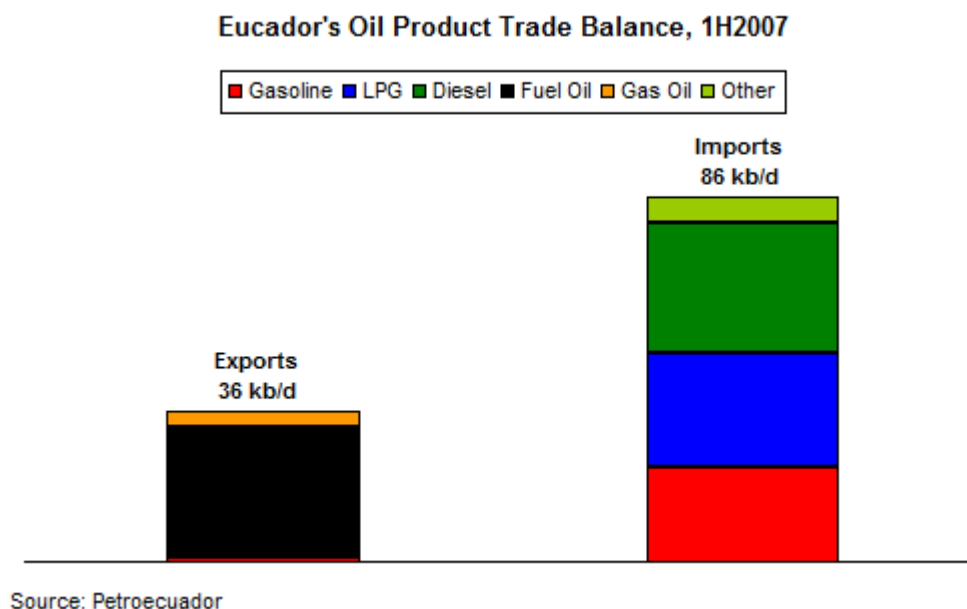
The second oil pipeline is the *Oleoducto de Crudos Pesados* (OCP). The 300-mile, 450,000-bbl/d OCP mostly parallels the route of the SOTE. The OCP began operations in September 2003, and its completion immediately doubled Ecuador's oil pipeline capacity. The completion of the OCP pipeline led to a sharp increase in Ecuador's crude oil production, as private companies were no

longer constrained by the capacity limits of the SOTE. Use of the OCP system is mostly confined to private oil producers, with Petroecuador relying upon SOTE.

Ecuador utilizes one international pipeline, the TransAndino. The 50,000-bbl/d pipeline connects Ecuador's oil fields with the Colombian port of Tumaco. The TransAndino pipeline has occasionally been the target of rebel forces in Colombia, and an attack in March 2008 shut the system down for several days.

Downstream Activities

According to OGJ, Ecuador has three oil refineries, with a combined capacity of 176,000 bbl/d. The largest refinery in Ecuador is Esmeraldas (110,000 bbl/d), located on the Pacific coast. Ecuador is a net importer of refined oil products: during the first half of 2007, Ecuador's Ministry of Energy and Mines reported that the country imported 86,000 bbl/d of refined products, while exporting 36,000 bbl/d. Further compounding the situation is the nature of Ecuador's trade in petroleum products: in general, the country exports heavy refined products, like fuel oil, and imports lighter products, such as gasoline, diesel, and liquefied petroleum gas (LPG). Since the heavy product exports command a much lower price on the world market than Ecuador must pay for the light product imports, the value of the net trade balance is more skewed than would be suggested by simply comparing import and export volumes.



The Ecuadorian government is actively seeking ways to increase domestic production of lighter petroleum products. These plans include building new refining facilities or upgrading the Esmeraldas plant to better handle Ecuador's heavy domestic crude production. In 2008, the Ecuadorian government announced that it had reached an agreement with Venezuela to build a 300,000-bbl/d refinery in Ecuador at an estimated cost of \$5 billion. The facility would be located in Manabi province and is expected to come online in 2012.

Natural Gas

Ecuador has relatively small proven natural gas reserves.

According to OGJ, Ecuador had 345 billion cubic feet (Bcf) of natural gas reserves as of January 2006. There is negligible domestic demand or support infrastructure for natural gas. The only large-scale natural gas project in Ecuador is the Amistad field, located in the Gulf of Guayaquil, which produced an estimated 30 million cubic feet per day (MMcf/d) during the first half of 2007. All of Amistad's natural gas production flows to Noble's Machala facility, a 130-megawatt (MW), onshore, gas-fired power plant that supplies electricity to the Guayaquil region.

Ecuador's oil industry produces a significant amount of natural gas as part of their operations: oil operators produced 118 MMcf/d of natural gas during the first half of 2007. However, most of that natural gas is flared, due to a lack of infrastructure to capture it. Ecuador's lack of infrastructure to develop natural gas reserves or capture associated gas production is a contributing factor to the

imbalance in its refined product trade. For example, natural gas could provide an alternative for imported LPG, which is principally used for residential heating and cooking. In addition, increased natural gas production could supply more gas-fired power plants, replacing expensive diesel generators.

Profile

Energy Overview

Proven Oil Reserves (January 1, 2008E)	4.5 billion barrels
Oil Production (2007E)	512 thousand barrels per day
Oil Consumption (2006E)	152 thousand barrels per day
Crude Oil Distillation Capacity (2008E)	176 thousand barrels per day
Proven Natural Gas Reserves (January 1, 2006E)	345 billion cubic feet
Natural Gas Production (2006E)	10 billion cubic feet
Natural Gas Consumption (2006E)	10 billion cubic feet
Recoverable Coal Reserves (2003E)	26.5 million short tons
Coal Production (2006E)	None
Coal Consumption (2006E)	None
Electricity Installed Capacity (2005E)	3.3 gigawatts
Electricity Production (2005E)	12.9 billion kilowatt hours
Electricity Consumption (2005E)	8.9 billion kilowatt hours
Total Energy Consumption (2005E)	0.4 quadrillion Btus*
Total Per Capita Energy Consumption (2005E)	29.8 million Btus
Energy Intensity (2005E)	5,612 Btu per \$2000-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2005E)	23.9 million metric tons
Per-Capita, Energy-Related Carbon Dioxide Emissions (2005E)	1.8 metric tons
Carbon Dioxide Intensity (2005E)	0.3 Metric tons per thousand \$2000-PPP**
Environmental Issues	deforestation; soil erosion; desertification; water pollution; pollution from oil production wastes in ecologically sensitive areas of the Amazon Basin and Galapagos Islands
Major Environmental Agreements	party to: Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands

Oil and Gas Industry

Organization	State-owned Petroecuador controls a large share of crude oil production. However, the sector is open to private operators, including both foreign and domestic companies.
Major Oil/Gas Ports	Balao, Esmeraldas.
Foreign Company	Largest foreign producers include Andes Petroleum, Repsol-YPF, Agip.

Involvement

Major Oil Fields	Shushufindi, Eden Yutui, Sacha, Dorine, Villano, Palo Azul
Major Pipelines	Sistema Oleducto Trans-Ecuatoriano; Oleducto de Crudos Pescados
Major Refineries (capacity, bbl/d)	Esmeraldas (110,000), La Libertad (46,000), Shushufindi (20,000)

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

Links

EIA Links

[EIA - Ecuador Country Energy Profile](#)

U.S. Government

[CIA World Factbook - Ecuador](#)

[U.S. Embassy in Quito, Ecuador](#)

[U.S. State Department Background Notes on Ecuador](#)

[U.S. State Department's Consular Information Sheet - Ecuador](#)

General Information

[International Monetary Fund \(IMF\) on Ecuador](#)

[World Bank on Ecuador](#)

Foreign Government Agencies

[Banco Central del Ecuador \(Central Bank\)](#)

[Fondo de Solidaridad](#)

[Instituto Nacional de Estadística y Censos \(National Statistical Office\)](#)

[Ministry of Energy and Mines](#)

Oil and Natural Gas

[OCP](#)

[Petroecuador](#)

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